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H_3^+ Formation on the Surface of Silica Nanoparticles Exposed to Strong Laser Field M. SAID ALGHABRA, RAMI ALI, Department of Physics,American University of Sharjah,Sharjah,UAE, PHILIPP ROSENBERGER, SAMBIT MITRA, RITIKA DAGAR, Department of Physics,Ludwig-Maximilians-Universitat; Max Planck Institute of Quantum Optics, Garching,Germany, VYACHESLAV KIM, HAMAD ALHARMI, SHARJEEL KHAN, MAZHAR IQBAL, Department of Physics,American University of Sharjah, MATTHIAS F. KLING, Department of Physics,Ludwig-Maximilians-Universitat;Max Planck Institute of Quantum Optics,Garching,Germany, ALI S. ALNASER, Department of Physics,American University of Sharjah,Sharjah,UAE — Laser-induced molecular reactions on aerosolized nanoparticles can lead to exotic chemical reactions. The formation of the trihydrogen cation H_3^+ from H_2O molecules attached to the surfaces of nanoparticles is one case that requires hydrogen migration and over the surface roaming mechanisms. In this presentation, we show that high-repetition rate reaction nanoscopy permits the investigation of the formation of H_3^+ cations on the surfaces of aerosolized nanoparticles. We use a novel high-power fiber-based laser system (Active Fiber) at a central wavelength of 1030 nm, repetition rate of 150 kHz, pulse durations of around 40 fs, and pulse energies reaching 6.2 μJ. The laser pulses were tightly focused onto a jet of aerosolized nanoparticles by a spherical silver mirror (f=10 cm). The aerosol source is operated with SiO_2 nanoparticles in water. The studies show remarkably different energies between the H_3^+ cations created on the surface of the nanoparticles and those created from the dissociation of isolated ethanol molecules.

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